

# TECHNICAL SERVICE MANUAL for

**MAESTRO®**

**FUZZTAIN**



Model MFZT-272A

**Norlin™**

NORLIN MUSIC, INC.  
(716) 681-7242

2500 Walden Ave.  
Buffalo, N.Y. 14225

## INTRODUCTION

This manual provides servicing and parts information for Maestro Model MFZT-1 Fuzztainer, manufactured by Norlin Music, Inc., 2500 Walden Avenue, Buffalo, New York 14225. The Maestro Fuzztainer generates low distortion sustain and low order odd harmonic distortion for guitar, bass and other electroacoustical music signals. Specifications for the Maestro Fuzztainer include:

Input Impedance . . . . .	1 megohm
Maximum Recommended	
Input Level . . . . .	-20dBm
Equivalent Input Noise . . . . .	-100dBm
Output Impedance . . . . .	20K ohms
Maximum Insertion Gain . . . . .	10dB
Maximum Output Level . . . . .	0dBm
Sustain (Compression) Characteristics:	
Maximum Gain . . . . .	45dB
Minimum Gain . . . . .	10dB
Compression Threshold . . . . .	-55dBm
Compressor Attack Time . . . . .	10 msec
Compressor Release Time . . . . .	500 msec
Compressor Constant Gain	
Frequency Response . . . . .	30 to 10kHz
Fuzz (Distortion) Characteristics:	
Soft Fuzz Distortion Type . . . . .	Low order odd harmonic
Hard Fuzz Distortion Type . . . . .	Odd harmonic
Fuzz Circuit Drive . . . . .	Compressor output
Power Requirements:	
Battery Operation (Excludes	
Lamp Current) . . . . .	9.0 VDC at 750 microamperes
External DC Source Operation . . . . .	12.0 VDC at 150 milliamperes
Maestro Battery Eliminator . . . . .	115/230 VAC, 50/60 Hz, 3 watts
Recommended Battery Type . . . . .	NEDA 1604
Estimated Battery Life . . . . .	300 hours

## CIRCUIT DESCRIPTION

The input signal from AXE jack J1 is ac coupled to 2X amplifier IC1B. IC1B feeds the DRIVE pot R5, which controls the level to the compressor.

R6, R8 and IC2 form the voltage controlled gain element of the compressor circuit. IC2 contains three N-channel enhancement mode MOSFETs utilized as voltage controlled resistors. The drain to source resistance ( $R_8 \rightarrow R_7$ ) decreases with positive gate to source voltage ( $V_6 \rightarrow V_7$ ).

To understand the operation of the compressor, assume that the output of IC3B is 4.0 volts and therefore IC2 has very high RDS. The signal from R5 is passed without attenuation to IC1A where it is amplified by both IC1A and IC5A. IC5A drives one-half of full wave rectifier Q3. At signal excursion below 3.4 volts, Q3 conducts pulling current out of lowpass filter IC3B. Pin 7 of IC3B goes positive, turning IC2 on, reducing the signal drive to IC1A, and thereby reducing the gain. The gain stabilizes at the point where Q3 starts to conduct (0.6 volts peak or -10dBm). IC3A and Q4 rectify the positive half of the waveform for full wave detection. The circuit compresses signals over a -55dBm to -20dBm input range to -10dBm output. Below -55dBm the compression amplifier will not turn Q3 or Q4 on so IC1A and IC5A run at their maximum gain of 45dB. Above -20dBm input, IC2 is saturated at its minimum resistance which reduces the gain of IC1A and IC5A to a minimum of 10dB. Q3, Q4, R17, and C19 provide a fast attack and slow decay. Q3 and Q4 charge C19 very quickly but when they turn-off, R17 is C19's only discharge path; hence, fast attack and slow decay.

The compressed signal from IC3A feeds SW1 and the distortion amplifier IC4A. CR2 and CR3 generate odd-harmonic distortion with the amount of distortion controlled by R34, R35, or R36. The lower the resistance, the more current flows through the diodes, and the more distortion is generated.

SW1 selects between the compressed and two distorted signals. Simultaneously, SW1 adjusts the output level, compressor gain, and distortion amount for each setting. The selected output is ac coupled to VOLUME pot R41 and to the stomp switch SW2. SW2 selects between the unaltered guitar signal and the Maestro Fuzztainer signal. When this signal is selected, the STATUS light L3 is turned on.

Power for the electronics comes through capacitance multiplier Q2. Q2 removes ripple on the low dc output of the battery eliminator. IC4B provides a

voltage reference at one-half the main supply voltage. Q1 forms a Darlington capacitance multiplier for the wheel lights, L1 and L2, to keep ripple current out of the ground lines. EXT. D.C. jack J2 disconnects the battery when using the battery eliminator.

## DISASSEMBLY

a) Pull out plungers on battery holder assembly (1, Figure 1) and remove battery holder assembly. Disconnect battery (2) if present and remove.

b) Loosen setscrews (3) securing dial assemblies (4 and 5) by inserting a 1/16-inch Allen wrench through holes in dial assemblies and remove dial assemblies. Lift off foot control assembly (6).

c) Remove nut (7) using a half inch nut driver, lock washer (8), three screws (9) and screw (10) from each end cap (11) and remove both end caps.

### CAUTION

Do not set Maestro Fuzztain unit on its side when removing second end cap as damage to rotary pot shaft or light assembly may result.

d) Position Maestro Fuzztain face down and carefully slide hinge assembly (12) out of housing assembly (32) making certain spring (13) around push switch assembly (19) does not fly off and remove spring.

e) Disconnect both five and two pin connectors on printed circuit board assembly (18) noting red wire on left side of five pin connector and white wire on left side of two pin connector.

f) Remove nuts (14) using a half inch nut driver and flat washers (15) from AXE and AMP jacks. Remove nut (16) using a 3/8-inch drive and flat washer (17) from EXT. D.C. jack and carefully remove printed circuit board assembly (18).

g) Loosen hex nut (20), lock washer (21) and flat washer (22) and slide out push switch (24), lock washer, and hex ring.

h) Carefully slide STATUS LED assembly (27) from clear lens/bushing (33) and remove LED assembly.

i) Slide foot pads and/or clear lens/bushing (33) out of their channels if replacement is required.

## TEST AND TROUBLESHOOTING

The Fuzztain requires no tuning or internal adjustments. When troubleshooting, refer to the circuit description, schematic diagram, and replacement parts list.

a) Visually inspect unit for broken wires, damaged components, loose connections and other obvious defects.

b) Make certain unit is connected and operated according to Owners Manual or instruction label located on bottom of unit. If possible, check associated equipment such as cables, battery or amplifier used with the unit.

c) Connect 9 volt dc power source to battery clip and turn DRIVE and VOLUME pots to maximum output level.

d) Apply a 200 millivolt peak-to-peak sine wave at a frequency of 500 Hz to AXE jack J1 and observe dc voltage levels and ac signal levels as shown on the schematic diagram using an oscilloscope.

### NOTE

A high impedance voltmeter (1 megohm per volt or higher) may be used to measure dc voltage levels. Note that voltage levels and waveforms displayed on the schematic diagram are not absolute values as readings may vary between units.

e) Once the problem is localized, check the suspected part by direct substitution if possible. Otherwise use a voltmeter or oscilloscope to determine the malfunctioning part.

**NOTE**

All replacement parts may be obtained from Norlin Music, Inc. However, many standard electronic parts may be obtained locally in less time than is required to receive them from Norlin. When purchasing replacement parts locally, check the parts list for proper value, tolerance and rating.

**REASSEMBLY**

a) Reassemble Maestro Fuzztain in reverse order of disassembly referring to the exploded view (Figure 1) and noting the following additions.

b) Finger tighten nuts (14 and 16) securing printed circuit board assembly (18) to housing assembly (32) to allow printed circuit board assembly to fit into slots of end caps (11). After both end caps are installed, tighten nuts (14 and 16).

c) Connect five pin connector (25) to printed circuit board assembly (18) making certain red wire (pin 1) is on left side of connector at bottom of printed circuit board.

d) Connect two pin connector (30) making certain black wire (pin 7) is on right side of connector at bottom of printed circuit board.

e) Slip dial assemblies (4 and 5) on rotary pot shafts (left dial assembly (4) marked "L" between "9" and "0" and right dial assembly (5) marked "R" between "9" and "0") and turn each dial assembly full counterclockwise and then clockwise.

f) Turn right dial assembly full counterclockwise. Holding dial assembly steady at "0," insert small screwdriver in hole at center of dial assembly and turn pot shaft full counterclockwise then approximately five degrees clockwise to relieve strain on pot shaft. Tighten setscrew (3).

g) Turn left dial assembly full clockwise. Holding dial assembly steady at "0," insert small screwdriver in hole at center of dial assembly and turn pot shaft full clockwise, then five degrees counterclockwise to relieve strain on pot shaft. Tighten setscrew (3).

h) Rotate both dial assemblies making certain their range is from "0" to "9".

**REPLACEMENT PARTS LIST**

**ORDERING**

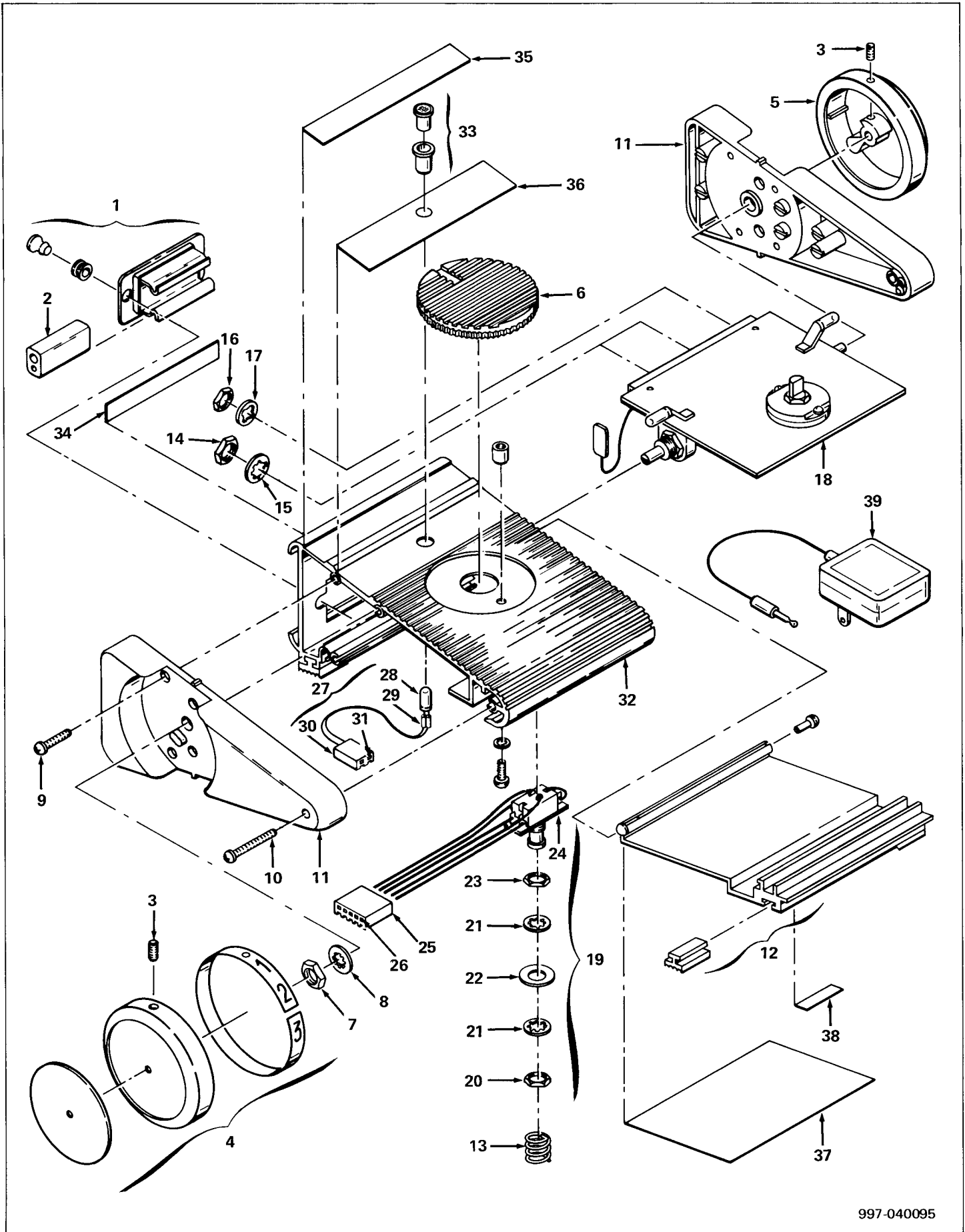
The following lists specify parts available from Norlin Music, Inc., Customer Service Department, 2500 Walden Avenue, Buffalo, New York 14225, (716) 681-7242. Please specify the unit name, model, serial number, part description, electrical reference designator if applicable and part number when ordering.

*MAESTRO FUZZTAIN REPLACEMENT PARTS LIST*

INDEX NO.	PART NUMBER	DESCRIPTION	QTY
Figure 1 1	997-040095-001	Maestro Fuzztain . . . . .	—
	997-040040-001	Battery Holder Assembly, consisting of: . . . . .	1
	964-040004-001	Battery Holder . . . . .	1
	930-040044-001	Plunger . . . . .	2
	930-040043-003	Grommet. . . . .	2
2		Battery, 9 Volt, NEDA 1604. . . . .	Ref
3	903-040486-061	Setscrew, No. 6-32 x 5/16 lg, Cup Point (Clad Plate) . . . . .	2
4	997-040041-001	Dial Assembly, Left Side, consisting of: . . . . .	1
	964-040020-001	Dial . . . . .	1
	913-040022-001	Decal, Dial, Left Side . . . . .	1
	913-040046-001	Decal, Disc . . . . .	1
5	997-040041-003	Dial Assembly, Right Side, consisting of: . . . . .	1
	964-040020-001	Dial . . . . .	1
	913-040022-003	Decal, Dial, Right Side . . . . .	1
	913-040046-001	Decal, Disc . . . . .	1

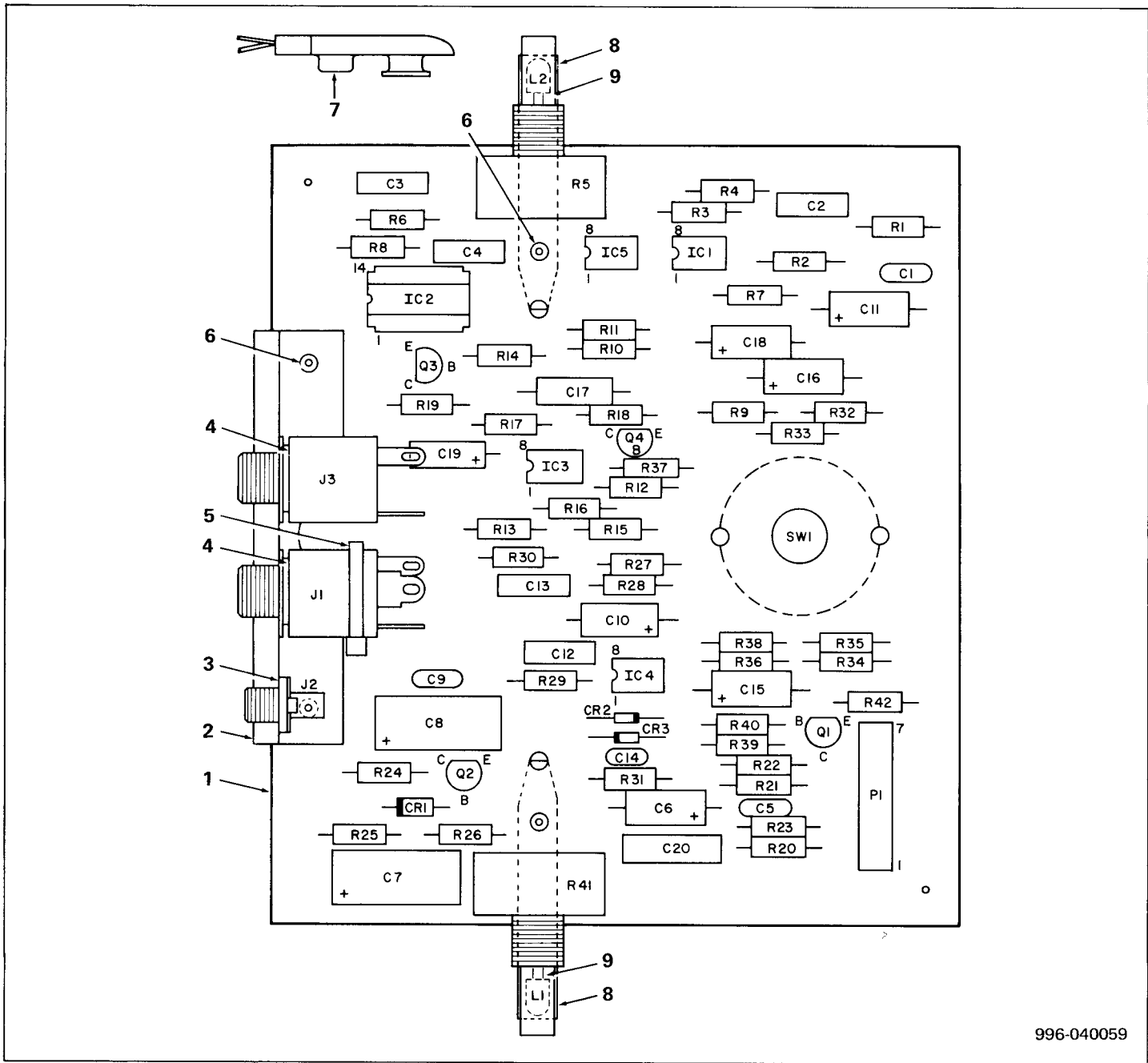
MAESTRO FUZZTAIN REPLACEMENT PARTS LIST (Cont.)

INDEX NO.	PART NUMBER	DESCRIPTION	QTY
6	997-040118-001	Foot Control Assembly, consisting of: . . . . .	1
	914-040114-001	Foot Control Top . . . . .	1
	913-040395-001	Decal, Pointer . . . . .	1
	976-040117-001	Spring, Knob . . . . .	1
	964-040055-001	Knob, Foot Control. . . . .	1
7	902-040504-007	Nut, 3/8-32 . . . . .	2
8	904-040065-014	Lock Washer, 3/8 Int. . . . .	4
9	811-040039-010	Screw, Self Tapping, No. 6A x 5/8 lg . . . . .	6
10	811-040032-016	Screw, Self Tapping, No. 6A x 1 lg . . . . .	2
11	968-040009-001	End Cap, Die Cast . . . . .	2
12	997-040099-001	Hinge Assembly, consisting of: . . . . .	1
	968-040014-003	Hinge Extrusion . . . . .	1
	916-040021-001	Foot Pad . . . . .	2
	905-040045-001	Rivet, Nylon . . . . .	2
13	975-040128-001	Spring, Compression . . . . .	1
14	902-040504-007	Nut, 3/8-32 . . . . .	2
15	904-042026-001	Flat Washer, 3/8 . . . . .	2
16	902-040400-001	Nut, 1/4 . . . . .	1
17	904-040399-001	Flat Washer, 1/4 . . . . .	1
18	996-040059-001	Printed Circuit Board Assembly (Refer to Figure 2) . . . . .	1
19	997-040098-001	Push Switch Assembly, consisting of: . . . . .	1
20	902-040504-006	Hex Nut (15/32 Bushing) . . . . .	1 Ref
21	904-040049-001	Lock Washer (15/32 Bushing) Int. Tooth . . . . .	2
22	904-040091-001	Flat Washer (15/32 Bushing) . . . . .	1
23	902-041442-007	Hex Ring (15/32 Bushing) . . . . .	1 Ref
24	960-040042-001	Push Switch, DPDT . . . . .	1
25	910-041714-005	Housing, Terminal, 5 Position . . . . .	1
26	910-041720-001	Pin . . . . .	5
27	997-040101-001	LED Assembly, consisting of: . . . . .	1
28	935-040111-001	Light Emitting Diode, Red . . . . .	1
29	965-040772-004	Tubing, Shrink, Black, 1/8 . . . . .	1
30	910-041714-002	Housing, Terminal, 2 Position . . . . .	5
31	910-041720-001	Pin . . . . .	2
32	997-040097-001	Housing Assembly, consisting of: . . . . .	1
	968-040013-003	Housing Extrusion. . . . .	1
	916-040021-001	Foot Pad . . . . .	2
	806-045039-004	Screw, No. 6-32 x 1/4 lg. . . . .	1
	904-040495-016	Lock Washer, No. 6 . . . . .	1
	973-040508-038	Spacer, No. 6-32 x 3/16 lg . . . . .	1
		Push Switch Assembly (See 19, Figure 1). . . . .	Ref
		Hinge Assembly (See 12, Figure 1) . . . . .	Ref
33	935-040119-001	Clear Lens / Bushing . . . . .	1
34	913-040083-001	Decal, EXT. D.C. - AXE - AMP . . . . .	1
35	913-040085-001	Decal, MAESTRO FUZZTAIN . . . . .	1
36	913-040088-001	Decal, DRIVE - STATUS - VOLUME . . . . .	1
37	913-040080-001	Instruction Label, Fuzztain . . . . .	1
38	913-040394-001	Decal, PAT PEND . . . . .	1
39	949-040092-001	Battery Eliminator. . . . .	1
	993-040397-001	Owners Manual . . . . .	1



997-040095

FIGURE 1 MAESTRO FUZZTAINER EXPLODED VIEW



996-040059

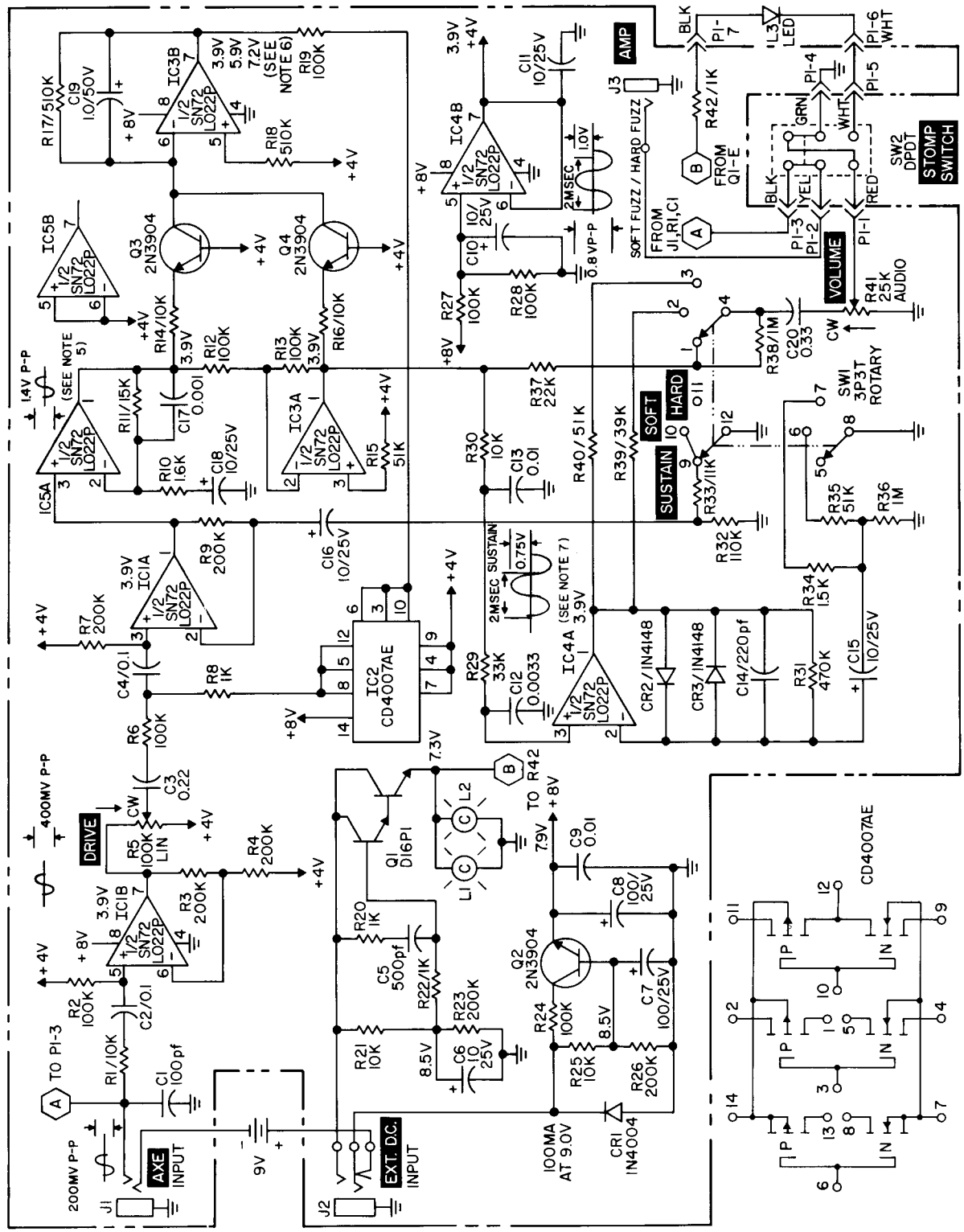
FIGURE 2 PRINTED CIRCUIT BOARD ASSEMBLY

PRINTED CIRCUIT BOARD ASSEMBLY REPLACEMENT PARTS LIST

INDEX NO. OR REF DESIG	PART NUMBER	DESCRIPTION	QTY
Figure 2	996-040059-001	Printed Circuit Board Assembly, consisting of: . . . . .	—
1	980-040058-001	Printed Circuit Board . . . . .	1
2	967-040019-001	Angle Bracket . . . . .	1
3	904-040065-001	Lock Washer, 1/4 Int. Tooth . . . . .	1
4	904-040065-014	Lock Washer, 3/8 Int. Tooth . . . . .	4
5	976-040793-001	Cable Tie, Small . . . . .	1
6	905-042027-004	Pop Rivet, 1/8 Dia. . . . .	4
7	935-041601-001	Battery Clip, 9 Volt . . . . .	1
8	967-040054-001	Lamp Bracket . . . . .	2

PRINTED CIRCUIT BOARD ASSEMBLY REPLACEMENT PARTS LIST (Cont.)

INDEX NO. OR REF DESIG	PART NUMBER	DESCRIPTION	QTY
9	965-040772-006	Tubing, Shrink, Black, 1/4 . . . . .	2
C1	947-042020-101	Capacitor, Disc, 100 pf. . . . .	1
C2,C4	946-041978-104	Capacitor, Polyester, 0.1 uf. . . . .	2
C3	946-041978-224	Capacitor, Polyester, 0.22 uf . . . . .	1
C5	947-042020-501	Capacitor, Disc, 500 pf. . . . .	1
C6,C10,C11, C15,C16,C18	945-040209-001	Capacitor, Aluminum, Electrolytic, 10 uf, 25 V . . . . .	6
C7,C8	945-040209-009	Capacitor, Aluminum, Electrolytic, 100 uf, 25 V. . . . .	2
C9	947-040200-103	Capacitor, Disc, 0.01 uf . . . . .	1
C12	946-041978-332	Capacitor, Polyester, 0.0033 uf . . . . .	1
C13	946-041978-103	Capacitor, Polyester, 0.01 uf . . . . .	1
C14	947-042020-221	Capacitor, Disc, 220 pf. . . . .	1
C17	946-040226-102	Capacitor, Mylar, 0.001 uf . . . . .	1
C19	945-040209-002	Capacitor, Aluminum, Electrolytic, 1.0 uf, 50 V . . . . .	1
C20	946-041978-334	Capacitor, Polyester, 0.33 uf . . . . .	1
CR1	919-042019-001	Diode, Rectifier, 1N4004 . . . . .	1
CR2,CR3	919-041075-001	Diode, 1N4148, Alt. 1N914 . . . . .	2
IC1,IC3,IC4,IC5	991-041209-001	Integrated Circuit, SN72LO22P . . . . .	4
IC2	991-041086-001	Integrated Circuit, CD4007AE. . . . .	1
J1	910-041306-004	Jack, Phone, 2 Circuit . . . . .	1
J2	910-040109-001	Jack, Phone, Miniature . . . . .	1
J3	910-041306-001	Jack, Phone, 1 Circuit . . . . .	1
L1,L2	939-040108-001	Lamp . . . . .	2
P1	910-041803-007	Connector, Straight, 7 Position . . . . .	1
Q1	991-041053-001	Transistor, Darlington, D16P1 . . . . .	1
Q2,Q3,Q4	991-041051-001	Transistor, NPN, 2N3904 . . . . .	3
R1,R14,R16, R21,R25,R30	852-312103-001	Resistor, 10K Ohms, $\pm 5\%$ , 1/4 W. . . . .	6
R2,R6,R12,R13, R19,R27,R28	852-312104-001	Resistor, 100K Ohms, $\pm 5\%$ , 1/4 W . . . . .	7
R3,R4,R7,R9, R23,R26	852-312204-001	Resistor, 200K Ohms, $\pm 5\%$ , 1/4 W . . . . .	6
R5	925-040033-001	Resistor, Rotary Pot, Audio, VOLUME, 25K Ohms . . . . .	1
R8,R20,R22,R42	852-312102-001	Resistor, 1K Ohms, $\pm 5\%$ , 1/4 W. . . . .	4
R10	852-312162-001	Resistor, 1.6K Ohms, $\pm 5\%$ , 1/4 W. . . . .	1
R11	852-312153-001	Resistor, 15K Ohms, $\pm 5\%$ , 1/4 W. . . . .	1
R15,R35,R40	852-312513-001	Resistor, 51K Ohms, $\pm 5\%$ , 1/4 W. . . . .	3
R17,R18	852-312514-001	Resistor, 510K Ohms, $\pm 5\%$ , 1/4 W . . . . .	2
R24	852-312101-001	Resistor, 100K Ohms, $\pm 5\%$ , 1/4 W . . . . .	1
R29	852-312333-001	Resistor, 33K Ohms, $\pm 5\%$ , 1/4 W . . . . .	1
R31	852-312474-001	Resistor, 470K Ohms, $\pm 5\%$ , 1/4 W . . . . .	1
R32	852-312114-001	Resistor, 110K Ohms, $\pm 5\%$ , 1/4 W . . . . .	1
R33	852-312113-001	Resistor, 11K Ohms, $\pm 5\%$ , 1/4 W. . . . .	1
R34	852-312152-001	Resistor, 1.5K Ohms, $\pm 5\%$ , 1/4 W . . . . .	1
R36,R38	852-312105-001	Resistor, 1 Megohm, $\pm 5\%$ , 1/4 W . . . . .	2
R37	852-312223-001	Resistor, 22K Ohms, $\pm 5\%$ , 1/4 W . . . . .	1
R39	852-312393-001	Resistor, 39K Ohms, $\pm 5\%$ , 1/4 W . . . . .	1
R41	925-040032-001	Resistor, Rotary Pot, Linear, DRIVE, 100K Ohms . . . . .	1
SW1	960-040064-001	Switch, Rotary, 3P3T. . . . .	1
XIC2	907-040307-007	Socket, Silicon, Integrated Circuit, 7 Pin . . . . .	2

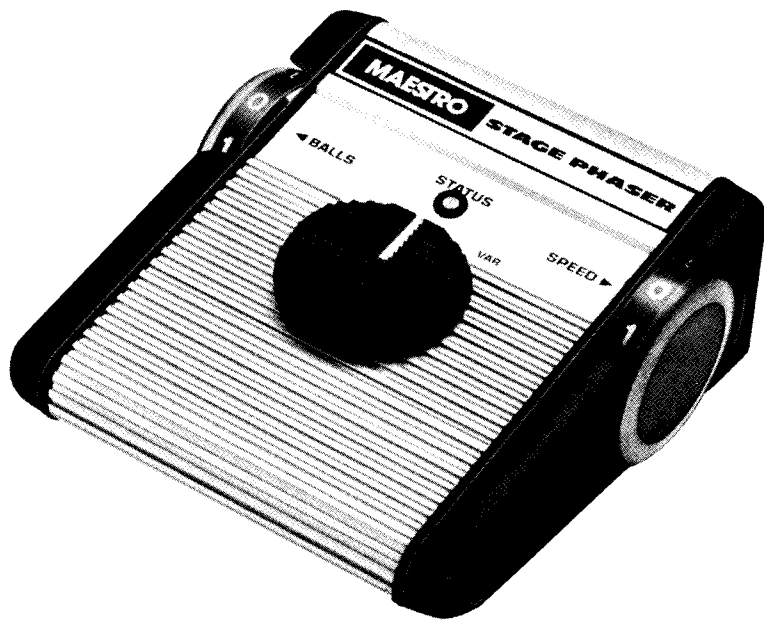


- NOTES:**  
UNLESS OTHERWISE SPECIFIED:
- 1) ALL RESISTOR VALUES ARE IN OHMS, 5%, 1/4 WATT.
  - 2) ALL CAPACITOR VALUES ARE IN MFD (µF).
  - 3) WAVEFORMS OBTAINED WITH DRIVE AND VOLUME POTS AT MAXIMUM.
  - 4) VOLTAGES MEASURED WITH OSCILLOSCOPE AND 9 VOLTS AT EXT DC INPUT.
  - 5) CONSTANT OVER INPUT RANGE OF 7MV TO 200MV.
  - 6) 3.9V NO SIGNAL; 5.9V 200MV INPUT; 7.2V 2V INPUT.
  - 7) SELECTOR SWITCH IN APPROPRIATE POSITION.
  - 8) BASING DIAGRAMS, TOP VIEWS:

FIGURE 3 FUZZTAIN SCHEMATIC DIAGRAM



MAESTRO PHASER  
MODEL MP - 273A  
MANUAL NO. 993-040658-001



MAESTRO STAGE PHASER  
MODEL MPP - 274A  
MANUAL NO. 993-040660-001



MAESTRO FUZZ  
MODEL MFZ - 271A  
MANUAL NO. 993-040657-001